UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,693	07/31/2003	Francois Leitner	HOE-768	3632

20028 7590 01/22/2009

Lipsitz & McAllister, LLC
755 MAIN STREET
MONROE, CT 06468

EXAMINER	
BRUTUS, JOEL F	

ART UNIT	PAPER NUMBER
3768	

MAIL DATE	DELIVERY MODE
01/22/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/632,693	LEITNER ET AL.	
	Examiner	Art Unit	
	JOEL F. BRUTUS	3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Mushabac (US Pat: 5,343,391).

Regarding claims 1-18, Mushabac teaches a device for use in a dental or medical application to obtain 3D contour information [see abstract] that anticipates the claimed invention. Mushabac teaches in fig 1, a computerized interactive system for producing a modification in the shape of an object such as a tooth to which access is limited comprises a first data generating device or assembly for providing a computer with electrically encoded data, specifically, digitized video signals representing a three-dimensional surface of an object such as a tooth. A second data generating device or assembly is operatively connected to computer for transmitting thereto digitized signals containing information pertaining to a curvilinear contour on the surface of the three-dimensional surface of the tooth [see column 11 lines 15-23]. In addition, the computer may receive from a third data generating device or assembly digitized input signals relating to internal structures of the tooth being scanned. Specifically, data generating device may take the form of an X-ray device such as used in current extra-oral or intra-

oral radiology or other methodologies and basically comprises a source 30 of X-ray radiation and a detector for receiving the X-ray radiation after it passes through a tooth and converting the incident radiation into a digital data stream fed to the computer [see column 11 lines 28-35];

Mushabac teaches that the computerized interactive dentistry system also comprises a display device such as a monitor or stereo or holographic projector. In response to data signals, computer generates a three-dimensional view on display of monitor of the tooth or teeth under examination. More specifically, computer is provided with any commercially available stereo photogrammetric triangulation program for calculating and displaying, on the basis of the video input signals from data generating devices three dimensional surfaces and contours of the tooth or teeth [see column 11 lines 47-57]; The computerized interactive dentistry system of FIG. 1 further includes another data generating device or assembly which provides computer with digitized information that can be displayed on video as to the location of the operative tip of a cutting instrument such as a dentist's drill relative to the three-dimensional structural features of the tooth. Data generating device thus enables computer to monitor modifications to the shape of the tooth as those modification are being made in the tooth and to display such changes through its monitor or video connection [see column 11 lines 48-57]. The system of FIG. 1 is further provided with any of several instruction input devices such as a keyboard , a mouse (not shown), or a contact sensitive surface of monitor , whereby an operator such as a dentist or dental technician may instruct the computer to display a desired tooth preparation on monitor [see column 11 lines 59-63].

Upon selecting a desired tooth preparation illustrated on monitor, the dentist operates drill to cut a recess into the tooth (in the case of a filling or inlay) or to remove an outer layer of the tooth (in the case of preparing a form/shape for a crown or other prosthetic restoration). Computer monitors the location of the operating tip of the drill via data generating device and, if the drill approaches a boundary previously defined to the computer from prior programmed parameters entered, for example, during an interactive tooth preparation selection operation, then signals are generated that display color changes of material removal information or interrupt the power provided to the drill via a supply or alert the dentist via an electro-acoustic transducer [see column 12 lines 1-15]. Data generating device includes a grid projection assembly for optically imposing a grid onto the surface of the patient's tooth. Data generating device also includes an opto-electrical transducer such as a charge-coupled device for optically sensing or scanning the tooth surface onto which the grid is projected by assembly [see column 12 lines 17-25]; Data generating device further comprises at least a pair of optoelectrical transducers preferably in the form of respective charge-coupled devices. Pantograph component enables computer to track, from outside the mouth, the motions of the tip of the stylus member inside the mouth and even beneath the gum line [see column 12 lines 12 lines 32-45]. Accordingly, data generating devices provide to computer electrically encoded data completely defining the structure of the tooth on which a dentist is working. Computer then "draws" and forms a graphic model of the tooth on monitor. At that juncture the dentist instructs the computer to modify the displayed three-dimensional shape. For example, the dentist may use keyboard to input a

command that a predefined tooth preparation, in graphic form, be overlaid on the three-dimensional graphic representation of the tooth. The size of the tooth preparation relative to the tooth may be specified by entering a depth dimension via keyboard, data generating device, a mouse or a contact-sensitive surface of monitor. Alternatively, computer may be programmed to automatically select a possible tooth preparation in accordance with the data from data generating devices [see column 12 lines 45-65].

In accordance with yet another alternative procedure, the dentist may command the computer to alter the graphic representation of the tooth, for example, by removing a layer of several millimeters from a surface selected by the dentist or by removing a selected volume of tooth from all five surfaces above the gum line to a contour below the gum line defined by the second data generating device. The selection of the desired surface area may include outlined boundaries made directly on the patient's tooth with the probe unit. These outline boundaries may be combined with additional programmed inputs that include a keyboard and/or a "mouse." As further depicted in FIG. 1 and described in detail hereinafter, data generating device comprises a pantograph-type component which incorporates drill and a pantograph extension in turn including a pantograph arm 68 and a bridge element. Bridge element connects pantograph arm to drill. Data generating device further comprises at least a pair of opto-electrical transducers preferably in the form of respective charge-coupled devices. Pantograph component enables computer to track, from outside the mouth, the motions of the tip of drill inside the mouth and even inside a tooth [see column 13 lines 10-18].

As shown in FIGS. 3 and 7, frame member and optical probe frame are provided with a stylus element having an enlargement at its distal end. Enlargement is disposable in the visual field of the respective optical scanning element or elements, whether CCD 98 and/or CCD 126, for providing computer with a reference distance or dimension at the surface of a subject tooth being scanned. Computer is thereby able to calculate absolute values for the dimensions of various surface features. Computer measures distances by calculating the number of pixels in the respective sensor array (e.g., 96a and 98a) which cover a feature whose dimensions are being determined. Inasmuch as computer is preloaded with the actual dimensions of enlargement, the computer is able to compute actual distances by comparing the number of pixels correpsonding to enlargement with the number of pixels corresponding to the features of the tooth [see column 14 lines 42-55]. Computer may provide a menu selection on monitor 34, selections being made from the menu via the keyboard, a mouse or a touch-sensitive monitor screen. In another structural procedure, a dentist and/or operator may use virtual preparation instruments to input specific percentages of tooth removal and to input specific boundaries and depths of tooth removal. The virtual preparation instruments include a telescopic stylus and/or drill substitutes. In yet another alternative procedure, computer may be programmed to recognize structural features of the tooth, such as its type, the location and shapes of cavities and prior inlays or onlays and to automatically select a possible preparation in accordance with the recognized features. The computer may be further programmed to vary the size of the preparation to correspond to the particular tooth. The dentist would then view the selected preparation

and alter it on screen by any of the above-described instruction input techniques. Computer 24 has a data memory loaded with electrically encoded data corresponding to all of the preformed inlays and onlays in the kit. More specifically, the predefined tooth preparations selectable automatically by computer or in response to instructions received via keyboard 40 or otherwise all correspond to respective prosthetic or restorative inserts of several predefined sizes.

Computer is preprogrammed to store in encoded form a plurality of possible final modifications or preparations of a tooth and for each such final preparation at least one respective intermediate stage in modifying the object at its surface to attain the respective modification. As described hereinabove, the modification of the tooth in accordance with the preprogrammed intermediate stage data may be implemented automatically by computer operating under numerical control. Computer thus uses the drill movement control assembly described above with reference to FIG. 15. It is to be understood that the modification of the tooth may be implemented by a machining or drilling process or more modern techniques such as laser etching. Pantograph assembly or, alternatively or additionally, encoders and articulated support arm assembly provide a system and procedure for automatically and precisely monitoring the motions of a dental instrument as it is being manipulated, either inside or outside the mouth of a patient. As described hereinafter, the motions and/or positions and orientations of the dental instrument may be recorded for subsequent playback or display on monitor. This playback is advantageous, for example, for pedagogical purposes. A skilled dentist or dentistry teacher uses a dental instrument to execute a

preferred or ideal technique, and successive positions and orientations of the instrument are input into a computer via pantograph assembly and its attendant cameras or, alternatively or additionally, encoders and articulated support arm assembly . Thus, these motion digitization devices are used to digitize the entire motion of a dental instrument or other tool as it approaches and begins work on an object (e.g., tooth) to be modified (e.g., machined or drilled). To receive and store the motion-encoding digital signals, computer 24 need only be programmed to recognize when such motion input is occurring. Recognition may be triggered, of course, by appropriate input, for example, via keyboard 40 (FIG. 1).

Response to Arguments

3. Applicant's arguments with respect to claimed invention have been considered but are moot in view of the new ground(s) of rejection.

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL F. BRUTUS whose telephone number is (571)270-3847. The examiner can normally be reached on Mon-Fri 7:30 AM to 5:00 PM (Off alternative Fri).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. F. B./
Examiner, Art Unit 3768

/Long V Le/
Supervisory Patent Examiner, Art Unit 3768